Instruction Manual

Glow Tube Scaler

Model 131A

Baird-Atomic, Inc.

33 UNIVERSITY ROAD • CAMBRIDGE 38, MASS.

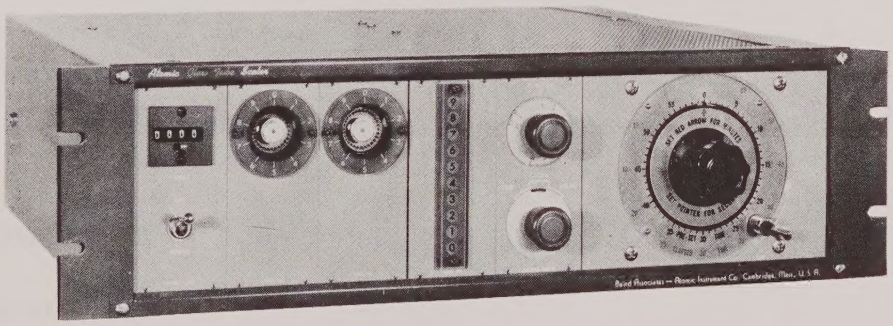
12 April 1962

Baird Atomic

Instruction Manual

Glow Tube Scaler

Model 131A



Baird Atomic

Baird-Atomic, Inc.

33 University Road, Cambridge 38, Massachusetts

CONTENTS

I. GENERAL DESCRIPTION

Description 1
Applications 1
Components 1
Specifications 1

II. INSTALLATION

Location 2
Connectors 2

III. OPERATION

IV. THEORY OF OPERATION

Model 988A Input Strip 3
Model 184 Decade Scaling Strip 3
Model 180 Scaling Strips 4
Model 1283 Drive Circuit 4
Model 381B Power Supply 4

V. PARTS LISTS

VI. SCHEMATICS

TABLES AND CHARTS

1. States of Conduction of Model 184 as Function of Count 5
2. Voltage and Resistance Measurements 6
3. Waveforms 7

MODEL 131A

I. GENERAL DESCRIPTION

The Model 131A is a scaler which can be used with all types of nuclear detectors. It is a low-heat, long-life scaler consisting of an input strip with an expander amplifier type of pulse height selector, a 5 μsec hard tube decade stage, two Dekatron scale-of-ten counting stages, a 4-digit electro-mechanical register, and a dual purpose timer (elapsed or preset time). It is self-contained with its own electronically regulated power supply and can provide some external power (as specified below).

Applications: With a Geiger tube the Model 131A requires an impedance transformer (eg., Baird-Atomic Model 231 Preamplifier with a gain of 1 as well as a separate high voltage supply).

For scintillation counting a preamplifier, linear amplifier, and, when desired, a pulse height analyzer are required. The scaler may also be used directly with scintillation detectors containing a built-in amplifier such as Baird-Atomic's Model 810B Bench-type Well Scintillation Detector. As in Geiger counting, a separate high voltage supply is required for scintillation work.

SPECIFICATIONS

Count Capacity: 7 decade, 9,999,999 count capacity

Resolving Time: Faster than 5 μsec

Input Sensitivity: 0.25v min, negative only

Input Impedance: 1,500 ohms

Pulse Height Selector (Range and Polarity): Adjustable stable discriminator calibrated at the input from 0.25v to 10v, negative only

Controls: POWER On-off

RESET Resets register and all scaling stages from a single switch

MODE SWITCH 60-cycle test, count, clock

TIMER Dual purpose precision timer controls preset time intervals or indicates elapsed time; calibrated in minutes and seconds up to 1 hour; accuracy $\pm$ 0.1 second.

Receptacles: Signal Input BNC(JK-36)

Preamplifier Power and Signal Input AN3102-16S-1S(JK-31)

Discriminator Output: BNC (JK-36)

External Power: +250v DC at 40 ma

−150v DC at 5 ma

6.3v AC at 2 amps

*Input Power: 115v AC, 60 cycles, at 1.3 amps

Dimensions: 19″ w x 5¼″ h x 17″ d

Net Weight: 30 lbs.

Shipping Weight: 45 lbs.

*(115v, 50 cycles or 220v, 50 cycles also available)

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_06570

II. INSTALLATION

Location. The equipment is self-contained. It may either be used in its own cabinet placed on a bench or table, or it may be removed and mounted in a relay rack. Since no side access is required, it can be placed next to a wall or between other units. There should be a back clearance behind the equipment sufficient to make connections and provide adequate ventilation.

The Model 131A General Purpose Scaler has three connectors and a power cord which are located on the rear of the chassis. J101 is an AN type providing B+, filament, signal and ground connections for an external preamplifier. J102 is a BNC type chassis connector wired in parallel with the signal lead in the AN connector; it may be used as a separate signal input from amplifiers, pulse height analyzers, etc. J103 connector is a BNC type JK chassis connector which provides an output connection from the Model 988A discriminator.

III. OPERATION

SEQUENCE FOR PUTTING THE MODEL 131A INTO OPERATION:

(Note: Make sure power switch is OFF before connecting to AC line.)

a. Set the operation control in the TEST position. Set the pulse height selector control at 0.25 volt. This position is indexed in red on the knob skirt.

b. Put the power switch on the Model 1283 Register Strip in the ON position. After a short warm-up time, orange glows will appear on the front of the decade scaling strip and in the two Dekatron counting tubes. These glows may come on indicating any number.

c. Depress the reset switch on the register. This will return all of the scaling strips as well as the mechanical register to zero.

d. Set the large black hand on the clock to one minute. This can be done by rotating the knob clockwise one unit (equals one click). Set the second hand at zero.

e. With the clock set at one minute, depress the clock switch to the ON position. This will direct pulses at a 60 cycle rate into the counter. This procedure is known as "60 cycle test." If the instrument is operating correctly, at the end of one minute the scaler will indicate 3600 counts $\pm$ a few counts (allowing for clock tolerance).

NOTE: On 60 cycle: 60 CPS times 60 seconds = 3600 CPM

On 50 cycle: 50 CPS times 60 seconds = 3000 CPM

The 60 cycle test signal will operate with the PHS knob *at not more than about 1 volt.*

The pulse height selector knob on the front of the Model 988A Input Strip is calibrated at the scaler input from negative 0.25 volts to negative 10 volts. By the use of the Pulse Height Selector, unwanted low level pulses from various detectors may be rejected; that is, the Model 131A Scaler will accept only pulses of an amplitude above that set by the Pulse Height Selector. It may also be used for integral pulse height analysis with such B/A Scintillation Probes as the Model 810B, 812B, 815B, and 818B.

The Model 685 Timer may be used as either a preset timer or elapsed timer. By setting the black hand on the black numbers the timer is used as a preset timer. By rotating the black hand 360° clockwise and noting the red indications the timer can be used to record elapsed time.

When the operation control switch is in the TEST position only the 60 cycle test signal will be counted with ON-OFF controlled by the timer lever. When the control switch is in the TIMER or CLOCK position, the scaler counting is also controlled by the timer. In the COUNT position, the scaler will count incoming pulses until it is stopped manually by turning the operational control switch to the TIMER position (with timer lever in the OFF position).

IV. THEORY OF OPERATION

This section discusses the theory of operation of each unit in the Model 131A Scaler with the amount of detail depending on the uniqueness of the design features.

Model 988A Input Strip. V101 A and B are connected as an amplifier, the gain of which is held constant by negative feedback through R105. Since the cathode of V101B and the grid of V103 are tied together, varying the bias on the grid of V101B by means of R113 (PHS) will determine the voltage on the grid of V103. Note that the cathode of V103 is held at +85 V by the VR tube, V102. Therefore a signal on the grid of V103 must exceed the difference between the grid and cathode of V103 in order to cause conduction of V103. The expander amplifier, V103, sends a negative signal to the Schmitt circuit, V104 A and B, the left-hand portion of which is normally conducting and the right-hand, cut-off. If the signal is sufficiently large (approximately four volts), it will cut off V104A, and the grid and cathode of V104B will move in opposite directions. This will cause V104B to conduct until the signal on the grid goes sufficiently positive to start conduction of V104A. At this point the cathode voltage of V104B rises, the plate voltage decreases, the voltage at the grid decreases, and V104B cuts off. Hence the output of the 988A Strip is negative square pulses.

Note that the clock can stop operation of the scaler by lowering the voltage on the quadrature grid of V103 (pin 6) when the selected amount of time has elapsed.

Model 184 Decade Scaling strip. This unit consists of four cascaded binary scaling pairs. Triggering of the binary scaling pair forming the input stage of the four cascaded stages is effected through two triggering diodes (V101). Each of the four binary scaling pairs consists of two resistance-coupled triode amplifiers having DC intercoupling to provide a circuit which exhibits two stable states of equilibrium. The circuit constants are such that when one triode is conducting, the grid of the other triode is held below cutoff by the DC coupling between the two sections. Conversely, the grid of the conducting triode is held firmly on by the plate circuit of the non-conducting triode. Thus, the circuit will remain in this condition of equilibrium until an external trigger causes it to flip over to its other equilibrium state. It will readily be seen that four such binary scaling pairs cascaded will produce one output pulse for every sixteen input pulses. However, by means of appropriate coupling connections and a feedback loop, the system is caused to reset to its zero count position after each tenth count. To provide a direct system of indication utilizing 10 neon lamps numbered from 0 to 9 consecutively, it is necessary to translate the applied input pulse to a voltage which lights only the appropriate lamp. This is accomplished by utilizing the plate potentials of all eight triodes of the decade in such a manner as to provide a unique voltage condition corresponding to the particular pulse applied. (See Table I for detail of states of conduction.)

Model 180 Scaling Strips. The next two scaling stages utilize the Dekatron cold cathode tube for scaling as well as visual representation of the count. These tubes have a visible cathode glow on one of a set of interconnected cathodes, arranged around a central common anode. This glow moves from one position to the next and sends an output pulse on the appearance of every tenth pulse. The voltages by which the transfer of the pulse is effected are derived from V101, a double triode, both halves of which are biased to cut-off. A positive-going pulse from the previous scaling stage applied to the grid of V101A produces a negative rectangular pulse at V101A plate which is coupled to guide electrode #1 (pin 3). The glow moves from the cathode to the guide electrode since the discharge can more easily take place with the higher potential difference that now exists between guide electrode and anode. At the end of the input pulse, V101A plate potential rises; this causes V101B to conduct and so produce a negative pulse for guide electrode #2 (pin 5). Since the voltage has just been removed from guide 1, the glow now moves to guide 2. At the end of this pulse, the discharge takes place between the nearest cathode and the anode. Thus it may be seen that the glow jumps one unit for each pulse input to the drive circuit of the glow tube.

Two of these circuits are cascaded so that along with the 184 strip, the three scaling strips produce one output pulse to the drive circuit of the electro-mechanical register for every 1000 input pulses.

Model 1283 Drive Circuit. A positive pulse from the last scaling strip fires V102, a gas tube normally off, and this sends current through the register for a period of time dependent on associated circuitry. The negative pulse at the plate of V102 is coupled to both the grid and plate of V101, cutting it off. C101 and C102 charge toward B+ until they are high enough to trigger V101 and cut off V102. This provides a pulse for the register which is precise and independent of the input waveform.

Model 381B Power Supply. After full-wave rectification by V101 and filtering by C101, C103, and L101, the +450 volts is fed to the glow tubes and to a voltage regulator circuit. The twin-triode (V103) is a series regulator which acts in opposition to the amplified fluctuations sent to the grids from V104. This produces a regulated +250 and +150 volts. The negative voltages are provided by half-wave rectification by V102; filtered, this gives −160 V as well as a −150 V regulated by a VR tube (V105).

Count	V102A	V102B	V103A	V103B	V104A	V104B	V105A	V105B
0	O	X	O	X	O	X	O	X
1	X	O	O	X	O	X	O	X
2	O	X	X	O	O	X	O	X
3	X	O	X	O	O	X	O	X
4	O	X	O	X	X	O	O	X
5	X	O	O	X	X	O	O	X
6	O	X	X	O	O	X	X	O
7	X	O	X	O	O	X	X	O
8	O	X	O	X	X	O	X	O
9	X	O	O	X	X	O	X	O
10 (0)	O	X	O	X	O	X	O	X

TABLE I.

Table showing conducting tubes marked "X" and non-conducting tubes marked "O" for each count position of the decade scaling strip circuit.

VOLTAGE READINGS

M. 988A Strip Measured with P.H.S. at approximately ".25"

Pin No. Tube	1	2	3	4	5	6	7	8	9	Tube Type
V101	250	78	82	6.3 A.C.	6.3 A.C.	138	0	.9	0	6201
V102	86	0	—	0	86	—	0	—	—	85A2
V103	86	82	0	6.3 A.C.	163	88	163	—	—	6BN6
V104	220	90	96	6.3 A.C.	6.3 A.C.	250	80	96	—	5965

M. 184 Strip (Readings at Reset Condition)

Pin No. Tube	1	2	3	4	5	6	7	8	9	
V101	178	178	0	6.3 A.C.	178	—	95	—	—	6AL5
V102	178	10	58	0	0	95	58	58	6.3 A.C.	12AU7
V103	197	10	58	0	0	85	58	58	6.3 A.C.	12AU7
V104	197	10	58	0	0	85	58	58	6.3 A.C.	12AU7
V105	197	10	58	0	0	85	58	58	6.3 A.C.	12AU7

M. 180 Strips (Voltage Reading at Reset Condition)

Pins Tubes	1	2	3	4	5	6	7	8	9
V101 (12AX7)	67	−150	−150	−150	−150	70	−150	−150	−150
V102 (GC10B)	1.4	1.4	68	230	64	1.4	45	1.4	—

M. 1283 Strip

Tubes Pins	1	2	3	4	5	6	7	Tube Type
V101	0	0	6.3 A.C.	0	0	12.5	0	5696
V102	−10	0	6.3 A.C.	0	0	250	0	5696

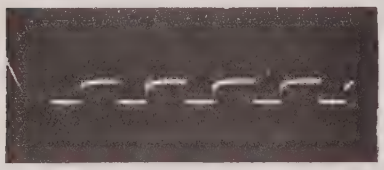
M381B (Power Supply)

Pin No. Tubes	1	2	3	4	5	6	7	8	Tube Type
V101	—	540	—	400 A.C.	—	400 A.C.	—	540	5V4
V102	−380	—	*	*	—	96	400 A.C.	—	6X4
V103	110	490	250	110	490	250	6.3 A.C.	0	6080
V104	−.5	0	0	6.3 A.C.	112	96	0	—	6BH6
V105	0	−150	—	−150	0	—	−150	—	6626

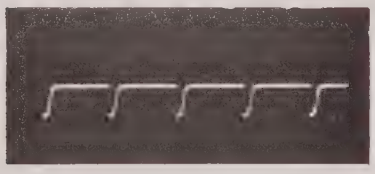
*6.3 A.C. between pins 3 and 4

1. Input pulse (5 kc)
   20μs/div.
   1v/div.

2. Output of 988A
   10μs/div.
   50v/div.



3. Output of 184
   1ms/div.
   50v/div.



4. Pulse at 1st Guide in M. 180
   1ms/div.
   100v/div.

5. Pulse at 2nd Guide in M. 180
   1ms/div.
   100v/div.

6. Output from 180
   1ms/div.
   50v/div.

7. Output from 180
   10ms/div.
   50v/div.

TABLE III. WAVE FORMS

PARTS LIST FOR MODEL 131A

MODEL 988A

Part No.		B-A No.
C101	.01 μf, ceramic, 10%, 500 V	CC 103-1
C102	27 μμf, ceramic, 10%, 500 V	CC 270-1
C103	.01 μf, ceramic, 10%, 500 V	CC 103-1
C104	.01 μf, ceramic, 10%, 500 V	CC 103-1
C105	.01 μf, ceramic, 10%, 500 V	CC 103-1
C106	.01 μf, ceramic, 10%, 500 V	CC 103-1
C107	.1 μf, paper, 10%, 200 V	CP 104-10
C108	.01 μf, ceramic, 10%, 500 V	CC 103-1
C109	56 μμf, ceramic, 10%, 500 V	CC 560-1
C110	.22 μf, mylar, 10%, 200 V	CP 224-3
C111	.01 μf, ceramic, 10%, 500 V	CC 103-1
R101	1 Meg. ½ W, 5%, comp.	RCE 105J
R102	4.7K, ½ W, 1%, metallized film	RF 472-1
R103	27K, 2 W, 5%, comp.	RCH 273J
R104	200Ω, ½ W, 5%, comp.	RCE 201J
R105	51K, ½ W, 1%, metallized film	RF 513-2
R106	51K, ½ W, 5%, comp.	RCE 513J
R107	30K, 2 W, 5%, comp.	RCH 303J
R108	220K, ½ W, 5%, comp.	RCE 224J
R109	8.2K, 2 W, 5%, comp.	RCH 822J
R110	24K, ½ W, 5%, comp.	RCE 243J
R111	2K, 2 W, variable wirewound	RA 202-1
R112	1.5K, ½ W, 1%, comp.	RCE 152J
R113	50K, 2 W, variable wirewound	RA 503-2
R114	10K, ½ W, 5%, comp.	RCE 103J
R115	1.5 Meg, ½ W, 5%, comp.	RCE 155J
R116	200K, ½ W, 5%, comp.	RCE 204J
R117	1 Meg, ½ W, 5%, comp.	RCE 105J
R118	300K, ½ W, 5%, comp.	RCE 304J
R119	6.2K, ½ W, 5%, comp.	RCE 622J
R120	510K, ½ W, 5%, comp.	RCE 514J
R121	2.7K, ½ W, 5%, comp.	RCE 272J
R122	5.1K, ½ W, 5%, comp.	RCE 512J
R123	12K, 2 W, 5%, comp.	RCH 123J
R124	7.5K, ½ W, 5%, comp.	RCE 752J
R125	68K, ½ W, 5%, comp.	RCE 683J
R126	120K, 1 W, 5%, comp.	RCG 124J
R127	510Ω, ½ W, 5%, comp.	RCE 511J
S101	Switch, wafer (Centralab #1473)	SR-9
V101	6201	6201

V102	85A2	85A2
V103	6BN6	6BN6
V104	5965	5965

MODEL 184

C101	100 $\mu\mu$f, ceramic, 5%, 500 V	CC 101-1
C102	47 $\mu\mu$f, ceramic, 5%, 500 V	CC 470-3
C103	0.01 $\mu\mu$f, ceramic, 5%, 500 V	CC 103-1
C104	47 $\mu\mu$f, ceramic, 5%, 500 V	CC 470-3
C105	22 $\mu\mu$f, ceramic, 5%, 500 V	CC 220-1
C106	47 $\mu\mu$f, ceramic, 5%, 500 V	CC 470-3
C107	22 $\mu\mu$f, ceramic, 5%, 500 V	CC 220-1
C108	22 $\mu\mu$f, ceramic, 5%, 500 V	CC 220-1
C109	47 $\mu\mu$f, ceramic, 5%, 500 V	CC 470-3
C110	22 $\mu\mu$f, ceramic, 5%, 500 V	CC 220-1
C111	47 $\mu\mu$f, ceramic, 5%, 500 V	CC 470-3
C112	27 $\mu\mu$f, ceramic, 5%, 500 V	CC 270-1
C113	47 $\mu\mu$f, ceramic, 5%, 500 V	CC 470-3
C114	47 $\mu\mu$f, ceramic, 5%, 500 V	CC 470-3
C115	22 $\mu\mu$f, ceramic, 5%, 500 V	CC 220-1
C116	22 $\mu\mu$f, ceramic, 5%, 500 V	CC 220-1
C117	47 $\mu\mu$f, ceramic, 5%, 500 V	CC 470-3
C118	0.01 $\mu\mu$f, ceramic, 5%, 500 V	CC 103-1
I101-110	Indicator Lamp NE-2	LA-3
R101	680K, ½ W, 5%, comp.	RCE 684J
R102	100K, ½ W, 5%, comp.	RCE 104J
R103	330K, ½ W, 5%, comp.	RCE 334J
R104	100K, ½ W, 5%, comp.	RCE 104J
R105	330K, ½ W, 5%, comp.	RCE 334J
R106	150K, ½ W, 5%, comp.	RCE 154J
R107	82K, ½ W, 5%, comp.	RCE 823J
R108	39K, 1 W, 5%, comp.	RCG 393J
R109	4.3K, 2 W, 5%, comp.	RCH 432J
R110	24K, 1 W, 5%, comp.	RCG 243J
R111	15K, ½ W, 5%, comp.	RCE 153J
R112	150K, ½ W, 5%, comp.	RCE 154J
R113	82K, ½ W, 5%, comp.	RCE 823J
R114	47K, ½ W, 5%, comp.	RCE 473J
R115	220K, ½ W, 5%, comp.	RCE 224J
R116	220K, ½ W, 5%, comp.	RCE 224J
R117	120K, ½ W, 5%, comp.	RCE 124J
R118	47K, 1 W, 5%, comp.	RCG 473J
R119	24K, ½ W, 5%, comp.	RCE 243J

R120	24K, ½ W, 5%, comp.	RCE 243J
R121	220K, ½ W, 5%, comp.	RCE 224J
R122	220K, ½ W, 5%, comp.	RCE 224J
R123	120K, ½ W, 5%, comp.	RCE 124J
R124	220K, ½ W, 5%, comp.	RCE 224J
R125	220K, ½ W, 5%, comp.	RCE 224J
R126	220K, ½ W, 5%, comp.	RCE 224J
R127	120K, ½ W, 5%, comp.	RCE 124J
R128	47K, 1 W, 5%, comp.	RCG 473J
R129	24K, ½ W, 5%, comp.	RCE 243J
R130	24K, ½ W, 5%, comp.	RCE 243J
R131	220K, ½ W, 5%, comp.	RCE 224J
R132	220K, ½ W, 5%, comp.	RCE 224J
R133	120K, ½ W, 5%, comp.	RCE 124J
R134	220K, ½ W, 5%, comp.	RCE 224J
R135	220K, ½ W, 5%, comp.	RCE 224J
R136	220K, ½ W, 5%, comp.	RCE 224J
R137	220K, ½ W, 5%, comp.	RCE 224J
R138	120K, ½ W, 5%, comp.	RCE 124J
R139	33K, 1 W, 5%, comp.	RCG 333J
R140	15K, ½ W, 5%, comp.	RCE 153J
R141	15K, ½ W, 5%, comp.	RCE 153J
R142	220K, ½ W, 5%, comp.	RCE 224J
R143	220K, ½ W, 5%, comp.	RCE 224J
R144	120K, ½ W, 5%, comp.	RCE 124J
R145	220K, ½ W, 5%, comp.	RCE 224J
R146	270Ω, 1 W, 5%, comp.	RCG 271J
R147	33K, 1 W, 5%, comp.	RCG 333J
R148	390K, ½ W, 5%, comp.	RCE 394J
R149	150K, ½ W, 5%, comp.	RCE 154J
P101	Connector, male, Amphenol, 16 pin assem. to A11809 plate	JK-32
V101	6AL5	
V102	12AU7	
V103	12AU7	
V104	12AU7	
V105	12AU7	
CR101	Germanium diode S151G	S151G

180

(Note for spare parts supply that two units of this scaling strip are required for the 131A)

C101	680 $\mu\mu$f, ceramic, 10%, 500 V	CC 681-3
C102	100 $\mu\mu$f, ceramic, 5%, 500 V	CC 101-1
C103	100 $\mu\mu$f, ceramic, 5%, 500 V	CC 101-1

P101	Connector, male, Amphenol Blue Ribbon, 16-pin. 26-159-16	JK-29
R101	220K, ½ W, 5%, comp.	RCE 224J
R102	220K, ½ W, 5%, comp.	RCE 224J
R103	3.6 meg, ½ W, 5%, comp.	RCE 365J
R104	7.5 meg, ½ W, 5%, comp.	RCE 755J
R105	220K, ½ W, 5%, comp.	RCE 224J
R106	510K, ½ W, 5%, comp.	RCE 514J
R107	1 meg, ½ W, 5%, comp.	RCE 105J
R108	560K, ½ W, 5%, comp.	RCE 564J
R109	100K, ½ W, 5%, comp.	RCE 104J
R110	68K, ½ W, 5%, comp.	RCE 683J
V101	12AX7	
V102	GC10B	

1283

C101	.1 μf, paper tubular, 600 V, 5%	CP 104-11
C102	0.04 μf, ceramic, 500 V, D.C.	CC 403-1
C103	220 μμf, ceramic, 5%, 500 V	CC 221-1
R101	68K, 1 W, 5%, comp.	RCG 683J
R102	1.5 meg, ½ W, 5%, comp.	RCE 155J
R103	10K, 1 W, 5%, comp.	RCG 103J
R104	22 meg, ½ W, 5%, comp.	RCE 226J
R105	1.8 meg, ½ W, 5%, comp.	RCE 185J
R106	470K, ½ W, 5%, comp.	RCE 474J
P101	Connector, male, Blue Ribbon type 16-pin.	JK-29
I101	Register, 4-digit, Sodeco type (TCez4E)	RG 9
V101	5696	
V102	5696	

381B

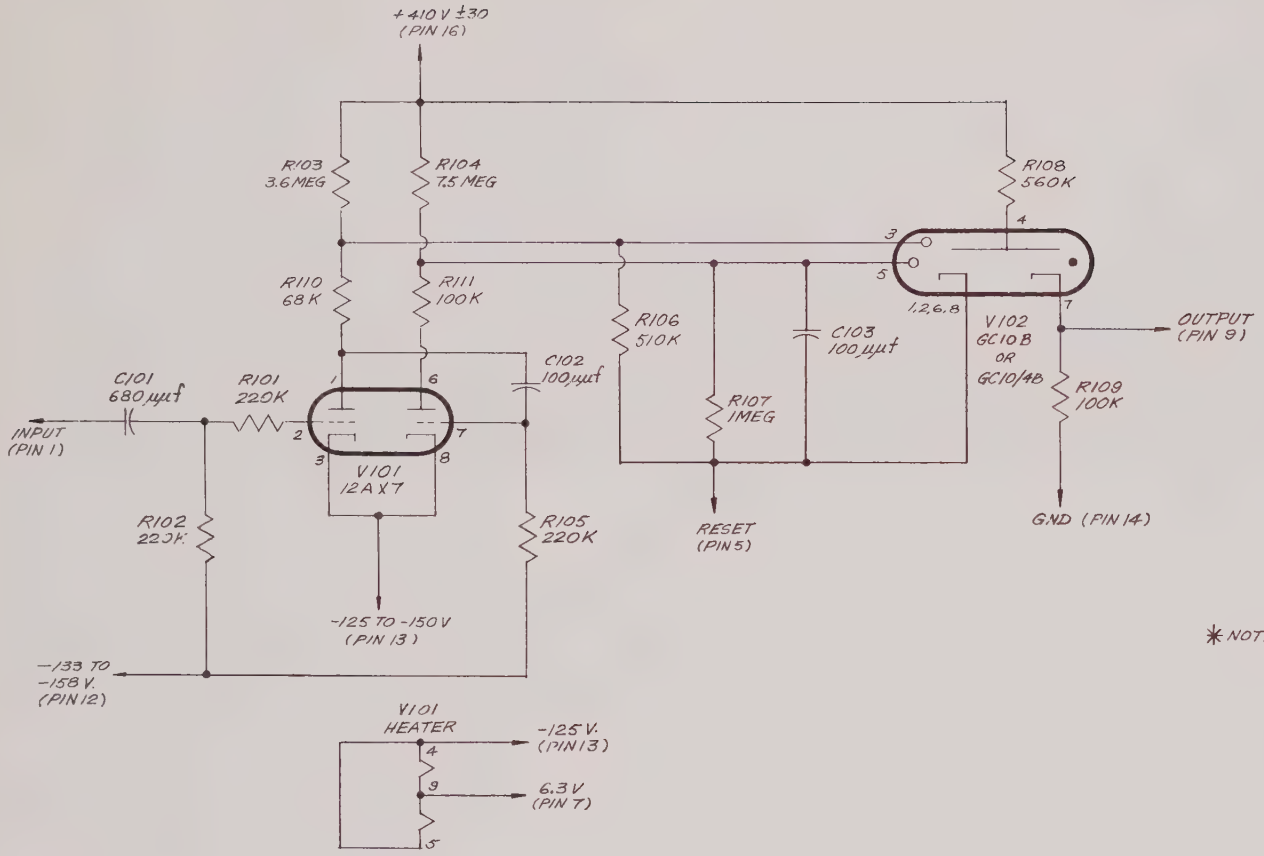
C101	4 μf, oil, 600 V. D.C.	CP 405-1
C102	4 μf, oil, 600 V. D.C.	CP 405-1
C103	4 μf, oil, 600 V. D.C.	CP 405-1
C104	8 μf, electrolytic, 350 V. D.C. (Sprague CE-63A-080P)	CE 805-2
C105	12 μf, electrolytic, 250 V. D.C. (Sprague CE-63A-120M)	CE 126-1
C106A&B	45 μf, electrolytic, 400 V. D.C. (Sprague CE-42A-450O)	CE 456-1
C107	.22 μf, mylar, 600 V. D.C.	CP 224-4
F101	Fuse, 2 amp. Slo-Blo	FS-8
J107	Connector, female, Jones type (12 pin)	JK-6
L101	Choke, 7 hy, 125 ma, 300Ω	LF-20
P101	Plug and linecord #18 — 6 foot	LC-1
R101	6K, 5 W, wirewound	RW 602-1
R102	2K, 2 W, 5%, comp.	RCH 202J

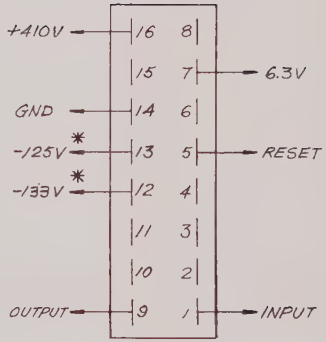
R103	510Ω, ½ W, 5%, comp.	RCE 511J
R104	100Ω, ½ W, 5%, comp.	RCE 101J
R105	10K, ½ W, 5% comp.	RCE 103J
R106	47Ω, ½ W, 5%, comp.	RCE 470J
R107	47Ω, ½ W, 5%, comp.	RCE 470J
R108	10K, ½ W, 5%, comp.	RCE 103J
R109	130K, 2 W, 5%, comp.	RCH 134J
R110	75K, 1 W, 5%, comp.	RCG 753J
R111	33K, 1 W, 5%, comp.	RCG 333J
R112	10K, 2 W, 5%, comp.	RCH 103J
R113	15K, 2 W, 5%, comp.	RCH 153J
R114	270K, ½ W, 5%, comp.	RCE 274J
R115	50K, potentiometer, 2 W, 5%	RV 503-5
R116	160K, ½ W, 5%, comp.	RCE 164J
R117	2K, 5 W, 5%, comp.	RCH 202J
T101	Power transformer: 800 V, C.T. @ 150 ma D.C.; 5.0 V @ 2A; 6.3 V @ 1A; 6.3 V @ 2.5A; 6.3 V @ 7A	TP-5
V101	5V4	
V102	6X4	
V103	6080	
V104	6BH6	
V105	6626	

Model 685

Preset and Elapsed Timer	CL-1

(Liebel and Flasheim Type 2D)





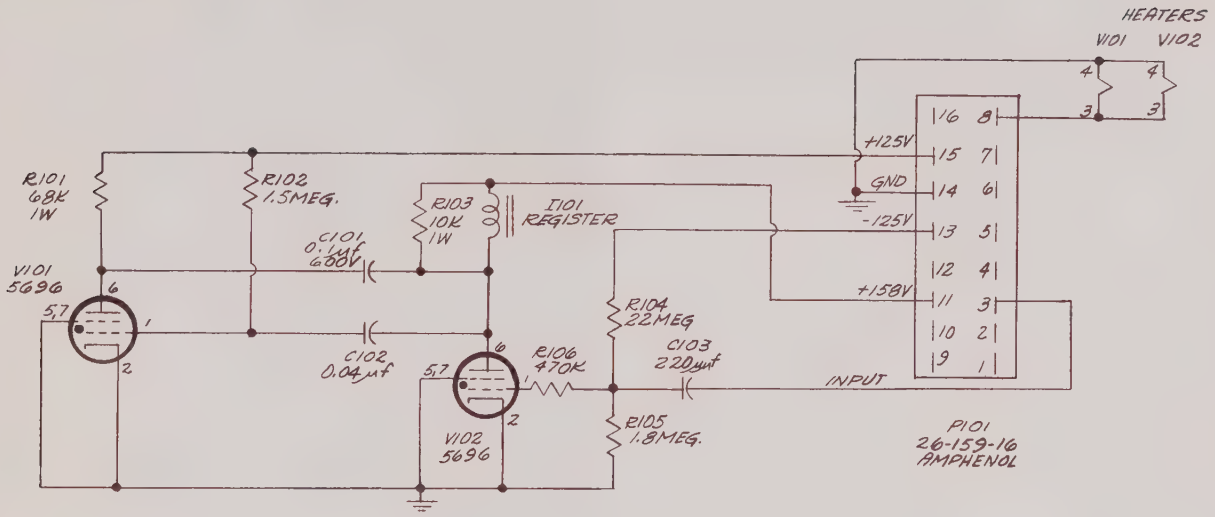
P104
16 PIN AMPHENOL
26-159-16

✱ NOTE: THE DIFFERENCE BETWEEN PIN 13 AND PIN 12 MUST EQUAL 8 ± 2 VOLTS.

UNLESS NOTED ALL RESISTORS ARE 1/2 WATT AND ± 5 %

SCHEMATIC
UNIT DECADE PLUG IN SERIES
MODEL 180

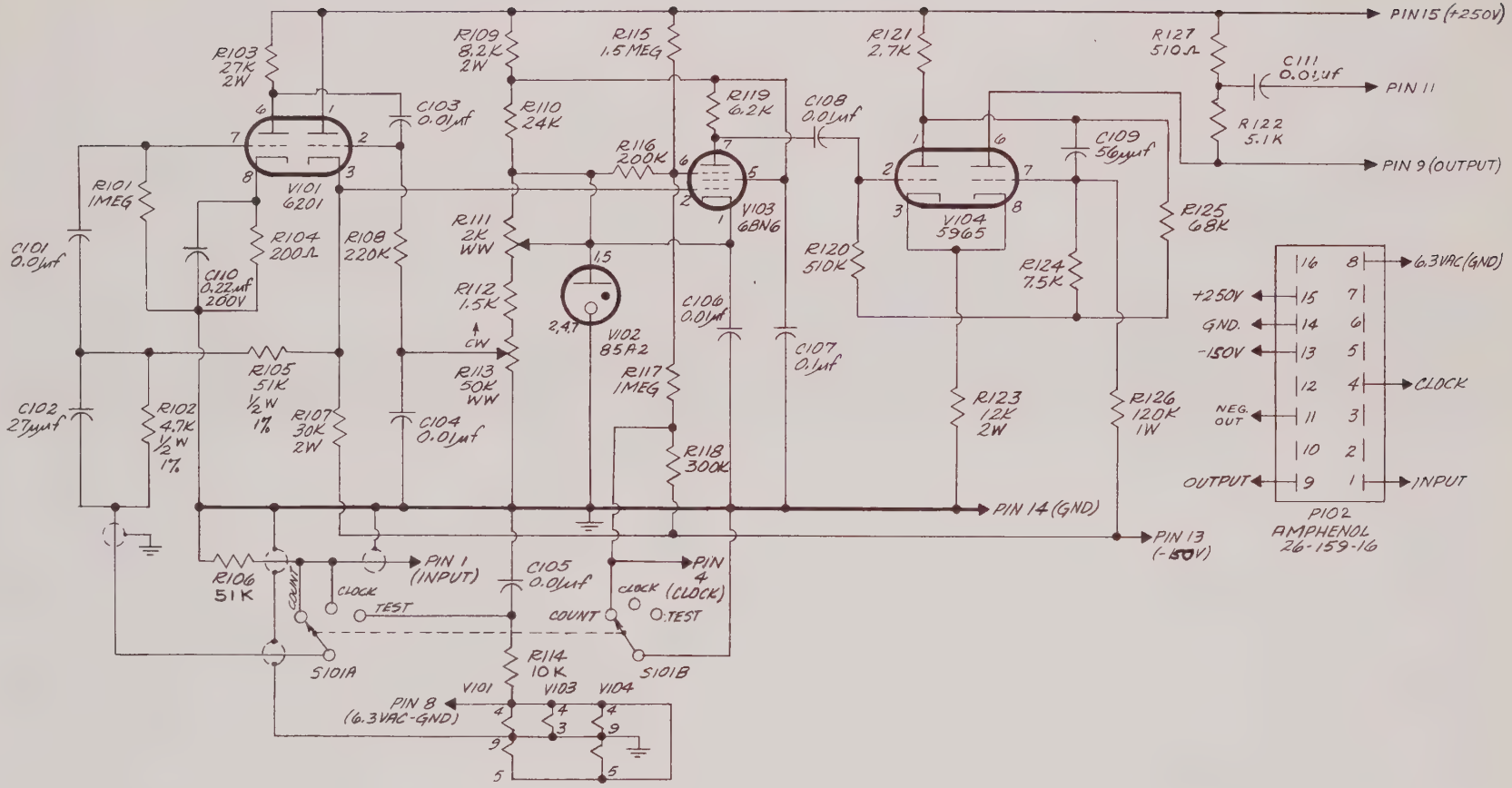
REV.
T



UNLESS NOTED ALL RESISTORS ARE 1/2WATT AND ± 5 %

SCHEMATIC - "UNIT" REGISTER
MODEL 1283A

REV.
D

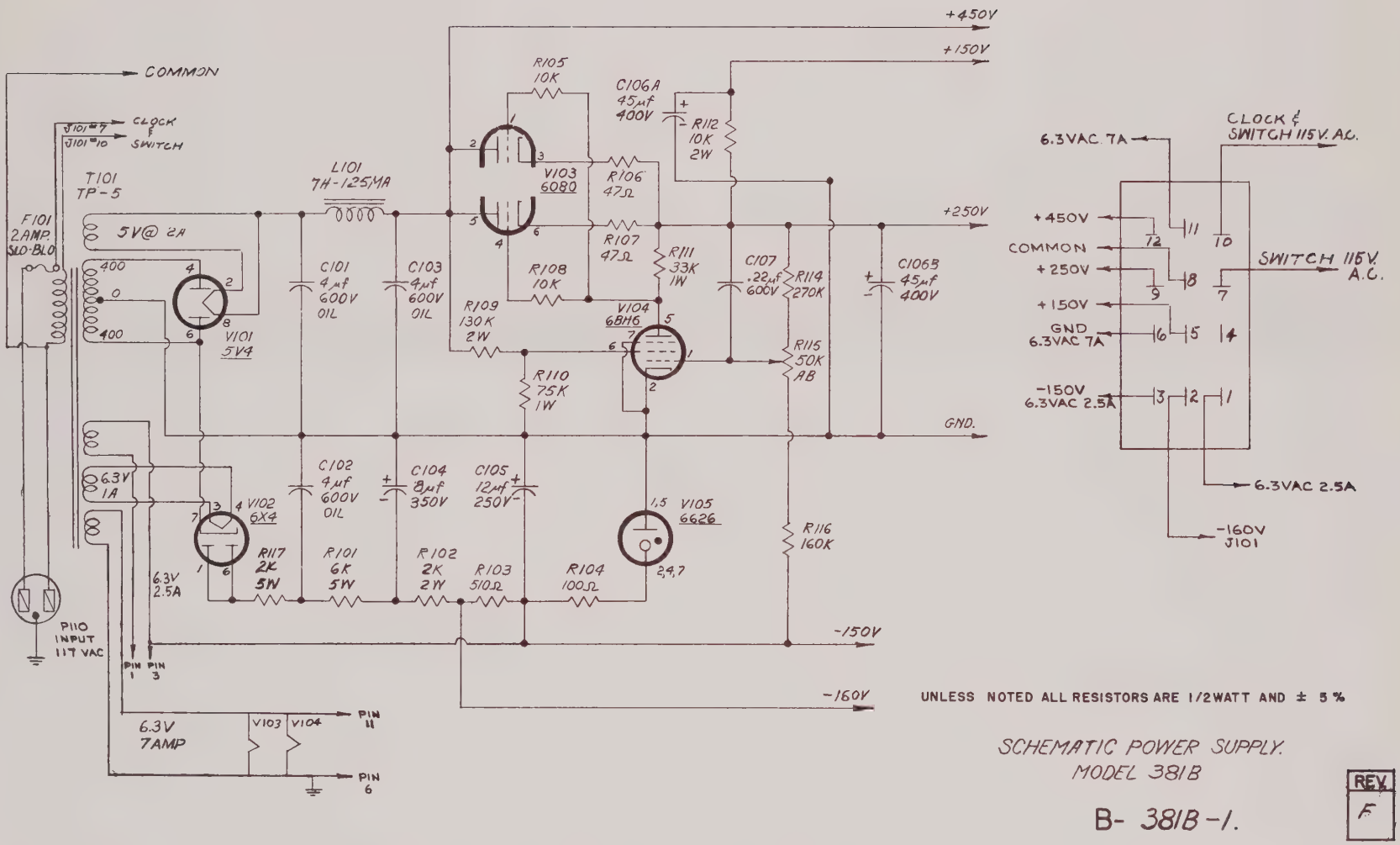


UNLESS NOTED ALL RESISTORS ARE 1/2WATT AND ± 5%

SCHEMATIC
PRE-EXPANDING AMPLIFIER
MODEL 988A

B- 988A-1

REV. E

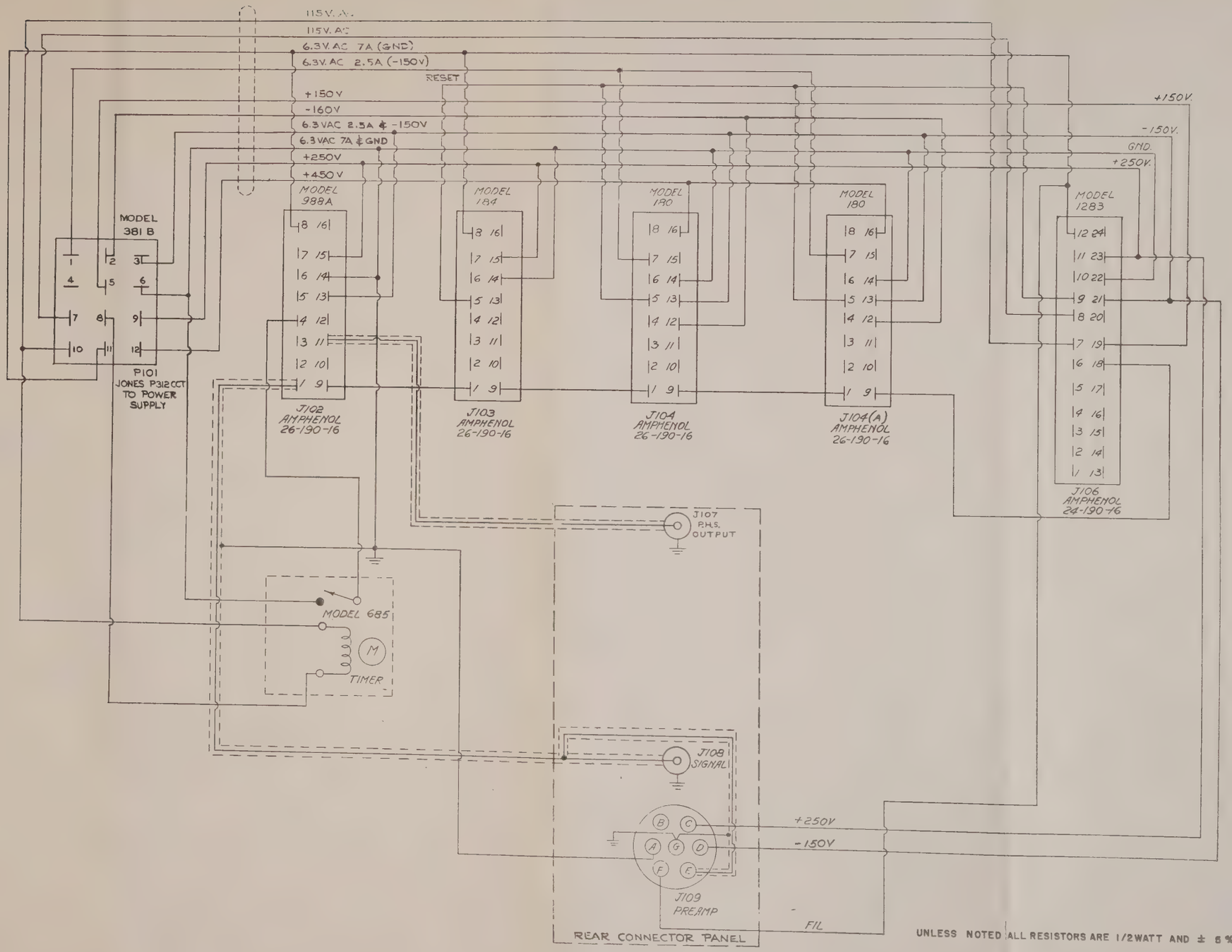


UNLESS NOTED ALL RESISTORS ARE 1/2WATT AND ± 5 %

SCHEMATIC POWER SUPPLY.
MODEL 381B

B- 381B -1.

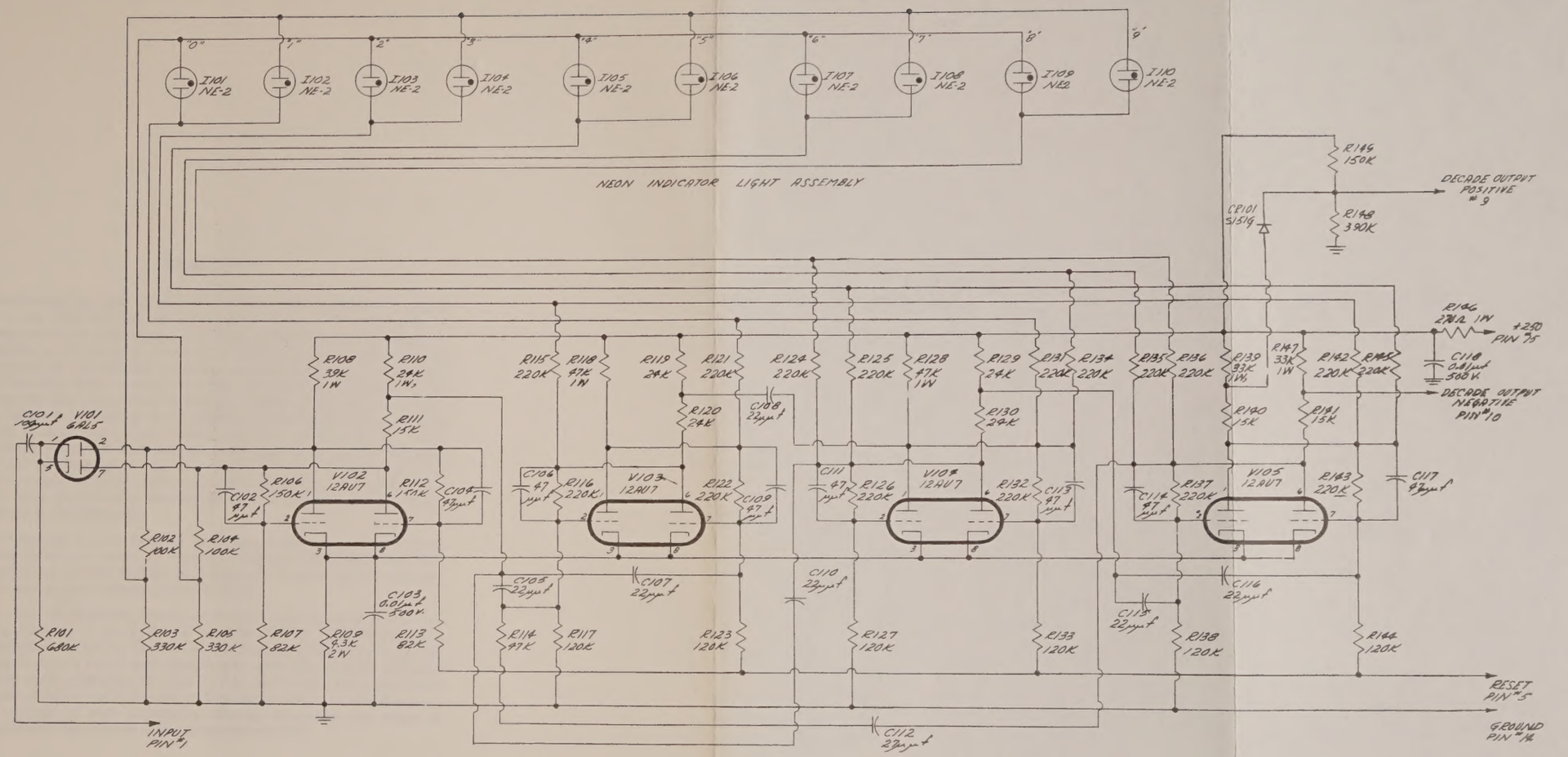
REV. F

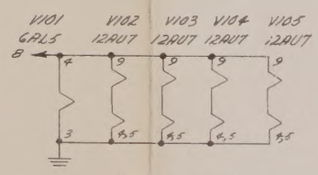


UNLESS NOTED ALL RESISTORS ARE 1/2WATT AND ± 5 %

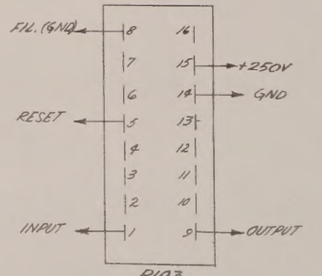
INTERCONNECTION WIRING DIAGRAM
FOR MODEL 131A SCALER

REV.
J





HEATER WIRING



P103
16 PIN AMPHENOL
26-159-16

NOTES:
1. ALL CAPACITORS IN μμf ARE DISC ± 5%.
2. ALL RESISTORS ARE ½ WATT ± 5% UNLESS OTHERWISE NOTED.
3. THIS UNIT IS A MODIFIED MODEL 111 STRIP.

SCHEMATIC
DECADE SCALING STRIP
5 MICROSEC / 100KC - 5 TUBE
MODEL 184

REV.
E

WARRANTY

Baird-Atomic, Inc. (the "Company"), warrants this equipment for a period of 1 year from the date of shipment as follows: it warrants that all equipment of its manufacture is free from defects in material and workmanship at the time of shipment. If within 1 year of shipment any equipment of the Company's manufacture develops defects in material or workmanship under normal conditions of operation, the buyer of the equipment may return it to the Company within 30 days of such failure, for repairs at the expense of the Company, including the expense of shipment, or in the case of any defective part may return such part to the Company which will repair or replace the same at its expense, including the cost of shipment. A further warranty of 1 year on the same terms shall be applicable to any part so repaired or replaced. Except for Dekatron glow tubes, this warranty does not extend to stock components not manufactured by the Company.

The Company shall not be liable for damage or destruction of instruments during delivery or caused by other than employees of Baird-Atomic, Inc.; in any event, liability shall not exceed the cost of replacement of defective parts upon prompt notification of such defect.

For return of equipment or any part thereof under the terms of the foregoing warranty a letter should be forwarded to Baird-Atomic, Inc., Attention: Sales Service Department, 33 University Road, Cambridge 38, Massachusetts. It should state owner's name and address; model and serial number of the equipment; the order number, under which it was purchased; the date of failure and a description of the circumstances surrounding same. Upon receipt of such information, shipping instructions for return of equipment or parts thereof will be forwarded promptly.

Baird-Atomic, Inc.
33 UNIVERSITY RD., CAMBRIDGE 38, MASS.